## (12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

## (19) World Intellectual Property Organization International Bureau



## 

(43) International Publication Date 22 April 2004 (22.04.2004)

PCT

(10) International Publication Number WO 2004/033067 A2

(51) International Patent Classification7: 27/06, 27/08, 35/00, 35/30

B01D 29/15,

(21) International Application Number:

PCT/US2003/031867

(22) International Filing Date: 7 October 2003 (07.10.2003)

(25) Filing Language:

**English** 

(26) Publication Language:

**English** 

(30) Priority Data:

60/417,285

8 October 2002 (08.10.2002)

- (71) Applicant (for all designated States except US): DON-ALDSON COMPANY, INC. [US/US]; 1400 West 94th Street, P.O. Box 1299, Minneapolis, MN 55440-1299 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): HARDER, David, B. [US/US]; 1713 Commonwealth Drive, Burnsville, MN 55337 (US). JOHNSON, Philip, Edward [GB/US]; 13145 Emmer Place, Apple Valley, MN 55124 (US). STENERSEN, Eivind [NO/US]; N8811 - 1047 Street, River Falls, WI 54022 (US). RAUSCH, Curt, A. [US/US]; 7704 West 85th Street Circle, Bloomington, MN 55438

(US). HACKER, John, R. [US/US]; 5614 Saint Andrews Avenue, Edina, MN 55424 (US).

- (74) Agent: BRUESS, Steven, C.; Merchant & Gould P.C., P.O. Box 2903, Minneapolis, MN 55402-0903 (US).
- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

## Published:

without international search report and to be republished upon receipt of that report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: FLUID FILTER AND METHODS

(57) Abstract: A fluid filter arrangement has a housing, a filter cartridge oriented within the housing, and a projection arrangement. The projection arrangement is oriented to space the filter cartridge from a wall of the housing in order to provide a fluid flow path between the filter cartridge and the housing wall. In some arrangements, the projection arrangement is part of an end cap. Embodiments of the projections include axial extensions, radial extensions, and angled extensions including both radial and axial components. Systems of use, methods of filtering, methods of making, and methods of servicing include arrangements of these types.

